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1: J Magn Reson. 1999 Apr;137(2):324-332.

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Magnetic Resonance Imaging of Gases: A Single-Point Ramped Imaging with T1 Enhancement (SPRITE) Study.

Prado PJ, Balcom BJ, Mastikhin IV IV, Cross AR, Armstrong RL, Logan A.

Department of Physics, University of New Brunswick, Fredericton, New Brunswick, E3B 5A3, Canada

A pure phase-encoding MRI technique, single-point ramped imaging with T1 enhancement, SPRITE, is introduced for the purpose of gas phase imaging. The technique utilizes broadband RF pulses and stepped phase encode gradients to produce images, substantially free of artifacts, which are sensitive to the gas T1 and T2 relaxation times. Images may be acquired from gas phase species with transverse relaxation times substantially less than 1 ms. Methane gas images, ¹H, were acquired in a phantom study. Sulfur hexafluoride, ¹⁹F, images were acquired from a gas-filled porous coral sample. High porosity regions of the coral are observed in both the MRI image and an X-ray image. Sensitivity and resolution effects due to signal modulation during the time-efficient acquisition are discussed. A method to increase the image sensitivity is discussed, and the predicted improvement is shown through 1D images of the methane gas phantom. Copyright 1999 Academic Press.

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